



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

09/422,154 10/21/99 POWELL

C 303/1/151

STEFAN J KLAUBER ESQ  
KLAUBER & JACKSON  
411 HACKENSACK AVENUE  
HACKENSACK NJ 07601

IM22/0907

EXAMINER

WYROZEBSKI, K

ART UNIT

PAPER NUMBER

1714

DATE MAILED:

09/07/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

Commissioner of Patents and Trademarks

**Office Action Summary**Application No.  
**09/422,154**

Applicant(s)

**Powell et al.**Examiner  
**Katarzyna Wyrozebski**Group Art Unit  
**1714**

- ☐ Responsive to communication(s) filed on \_\_\_\_\_
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

**Disposition of Claim**

- ☒ Claim(s) 1-30 is/are pending in the application
- Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-30 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

**Application Papers**

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been received.
- ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- \*Certified copies not received: \_\_\_\_\_
- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

- ☒ Notice of References Cited, PTO-892
- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s) \_\_\_\_\_
- ☐ Interview Summary, PTO-413
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

**— SEE OFFICE ACTION ON THE FOLLOWING PAGES —**

Art Unit: 1714

## DETAILED ACTION

### *Claim Rejections - 35 U.S.C. § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 10, 11, 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Mardis (U.S. 5,718,841).

Mardis discloses an organoclay composition which contain a quaternary ammonium salts wherein the ammonium salts further contain esters having 8-30 carbon atoms. The composition of Mardis can be utilized in fluid systems such as paints, coatings or inks. The examiner would like to point out at this time that the statement in claim 10 "...useful in preparing clay-polymer composites..." is only a statement of intended use not required by the present claims. The clays in the disclosure of Mardis are semectite type clays having cation exchange capacity greater than 75 milliequivalents per 100 grams of clay (col. 3, lines 46-50). The examples of semectite clays capable of cation exchange listed in the prior art of Mardis include but are not limited to morilonite and bentonite (col. 4, line 41), saponite (col. 4, line 42), hectorite (col. 4, line 50) as

Art Unit: 1714

well as other "generic" type smectite clays. The preferred clays in the disclosure of Mardis are converted to the sodium (col. 4, lines 56-59), and where the above clays utilized to make organoclay. The quaternary ammonium salt utilized to exfoliate the clay of the disclosure of Mardis contains at least one ester (col. 5, lines 45-60) wherein the esters are derived from naturally occurring fatty oils such as corn oil, coconut oil, soybean oil, cottonseed oil, castor oil, as well as animal and vegetable oils such as tallow oil (col. 6, lines 17-23). Particularly preferred quaternary ammonium compounds include diesters also called diester quads (col. 6, lines 46-47). These ammonium compounds are utilized to expand the layers of the clay compound which later is mixed with polymeric components such as polyester or epoxy resins (col. 9, lines 46-50) which satisfies the requirement of claims 1-3, 10, 11, 21-23 of the present invention. Although the prior art does not specifically say that the organoclay is useful for making nanocomposites, but disclosing its incorporation into resins such feature becomes inherent, therefore the prior art of Mardis encompasses the nanocomposites. The prior art of Mardis discloses, that the preferred fatty acids have 12 carbon atoms or more, and although the iodine value of these compounds is not disclosed, it is well known in the art as well as supported by the prior art of Franklin (U.S. 6,037,315), incorporated herein by reference, that the fatty acid esters derived from for example tallow oil (C16-C18) which is distilled has iodine value of 20-90.

In the light of the above disclosure, the prior art of Mardis satisfies the requirements of claims

Art Unit: 1714

*Claim Rejections - 35 U.S.C. § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was

Art Unit: 1714

made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mardis (U.S. 5,718,841) in view of Franklin (U.S. 6,037,315).

Mardis discloses an organoclay composition which contain a quaternary ammonium salts wherein the ammonium salts further contain esters having 8-30 carbon atoms. The composition of Mardis can be utilized in fluid systems such as paints, coatings or inks. The examiner would like to point out at this time that the statement in claim 10 "...useful in preparing clay-polymer composites..." is only a statement of intended use not required by the present claims. The clays in the disclosure of Mardis are smectite type clays having cation exchange capacity greater than 75 milliequivalents per 100 grams of clay (col. 3, lines 46-50). The examples of smectite clays capable of cation exchange listed in the prior art of Mardis include but are not limited to morilonite and bentonite (col. 4, line 41), saponite (col. 4, line 42), hectorite (col. 4, line 50) as well as other "generic" type smectite clays. The preferred clays in the disclosure of Mardis are converted to the sodium (col. 4, lines 56-59). The above clays utilized to make organoclay satisfy the requirement of claims 19 and 20 of the present invention. The quaternary ammonium salt utilized to exfoliate the clay of the disclosure of Mardis contains at least one ester (col. 5, lines 45-60) wherein the esters are derived from naturally occurring fatty oils such as corn oil, coconut oil, soybean oil, cottonseed oil, castor oil, as well as animal and vegetable oils such as tallow oil

Art Unit: 1714

(col. 6, lines 17-23). Particularly preferred quaternary ammonium compounds include diesters also called diester quads (col. 6, lines 46-47). These ammonium compounds are utilized to expand the layers of the clay compound which later is mixed with polymeric components such as polyester or epoxy resins (col. 9, lines 46-50) which satisfies the requirement of claims 1-3, 10, 11, 21-23 of the present invention. Although the prior art does not specifically say that the organoclay is useful for making nanocomposites, but disclosing its incorporation into resins such feature becomes inherent, therefore the prior art of Mardis encompasses the nanocomposites. The prior art of Mardis discloses, that the preferred fatty acids have 12 carbon atoms or more.

The difference between the present invention and the prior art of Mardis is showing of a particular ammonium compound which can be utilized in organoclays.

With respect to the above difference, the prior art of Franklin discloses an ammonium compound which although are utilized in cosmetic industry can as well be mixed with ceramics such as kaolin clay or already modified smectite clay and polymers (col. 19, lines 59-63). Since the ammonium compound of Franklin can be utilized equally with modified or unmodified clays utilizing them with the smectite clay of Mardis would be an obvious modification suggested by this secondary reference. In particular, the prior art of Franklin concentrates on actually quaternary ammonium compound composition more than its use. According to the disclosure of Franklin the quaternary ammonium compound is a mixture of mono-, di- and triesters wherein the amount of the diester is greater than 50% and the amount of triester is less than 25% which further satisfies the requirements of claims 4, 5, 12, 13, 24 and 25 of the present invention (see

Art Unit: 1714

Abstract). In the disclosure of Franklin, the molar ration of the fatty acid to the alkanol amine is generally in the range of 1.4-2.0 (col. 4, lines 44-45) as it is also required by claims 14 and 26 of the present invention. These compounds are products of  $C_{12}$ - $C_{22}$  fatty acids or hydrogenation products thereof with alkanol amine in the presence of the acid catalyst (col. 4, lines 3-11). The esters utilized in the disclosure of Franklin are derivatives of the fatty acids such as soy, tallow, palm, rapeseed, lard and the like (col. 4, lines 16-21). The fatty acids of the disclosure of Franklin have iodine value of 20-90 and with the amounts of mono-, di- and triesters discussed earlier satisfy the requirement of claims 6-9, 15-18, and 27-30 of the present invention. With respect to the anion which accompanies the cationic clay compound such include halogens and sulfates such as  $CH_3SO_4$  or  $C_2H_5SO_4$  (col. 6, lines 29-30).

Quaternary ammonium salts are incorporated into the smectite clays for various reasons. The long chains of the fatty acids are capable of stabilizing the composites, and they can be reactive towards the polymeric matrix wherein the adhesion between the polymer and clays is improved. Some compositions are utilized in order to gel the organic liquids or to form nanocomposites and as a rheological additive.

In the light of the above disclosure, it would have been obvious to one with the ordinary skill in the art at the time of the instant invention to utilize already known ammonium salt of Franklin with the smectite type clays as it is also suggested in this prior art and utilize it in the composition of Mardis since both prior art utilize quaternary ammonium compound containing fatty acid esters derived from the same origin.



Art Unit: 1714

6. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mardis (U.S. 5,718,841) in view of Franklin (U.S. 6,037,315) as applied to claims 1-30 above, and further in view of Ross (EP 952,187).

The discussion of the disclosure of the prior art of Mardis in view of Franklin from paragraph 5 of this office action is incorporated here by reference.

The difference between the present invention and the prior art of Mardis and Franklin is further proof of showing that the quaternary ammonium salt containing fatty acid esters can be utilized in organoclay/polymer nanocomposites.

With respect to the above difference, the prior art of Ross discloses a clay/polymer nanocomposite wherein the clay is smectite clay, which is modified with quaternary ammonium salts. The clays of Ross include montmorillonite, bentonite, hectorite, saponite, stevensite and beidellite (page 5) and where the ammonium salt has at least one alkyl or alkyl-ester group having 8-30 carbon atoms (page 6). The prior art of Ross further belongs to the same assignee as the prior art of Mardis which is RHEOX, INC. Therefore the same organoclays can be incorporated in both cosmetic compositions and nanocomposites.

The nanocomposites having quaternary ammonium compounds substituted with fatty acid ester been made for sometime know. Changing the number of the fatty acid ester substituents on the ammonium salts would have been an obvious modification as well as its utilization in polymer matrix since the adhesion between the polymers and clay would increase.


Art Unit: 1714

In the light of the above disclosure, it would have been obvious to one with the ordinary skill in the art at the time of the instant invention to utilize the expanded clay from the disclosures of Mardis and Franklin as it has been done in the disclosure of Ross, since the prior art references teach utilizing this types of clays with polymers wherein the quaternary ammonium compounds in each case have at least one ester derived from long chain fatty acids.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna I. Wyrozebski whose telephone number is (703) 306-5875. The examiner can normally be reached on Monday through Thursday from 7:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan, can be reached at (703) 306-2777. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Katarzyna I. Wyrozebski-Lee

August 30, 2000

EDWARD J. CAIN  
PRIMARY EXAMINER  
GROUP 1500

